Welcome to the first newsletter for alumni of the Department of Civil & Structural Engineering (and the Department of Mining Engineering, which we have adopted as their alumni have no other home since it closed). The University newsletter can’t have much space for news about the Department and yourselves, and so we hope you will be interested in this more focussed report, which we intend to produce annually.

The department is in good shape. On research, we are 5 rated in the Research Assessment Exercise of 2001, meaning that all our work is national or international in standard. We probably have the strongest structures research group of all the redbrick universities, and certainly have the strongest team in environmental engineering. The University is investing in the Department from the national Science Research Infrastructure Fund and with new academic positions. The Health and Safety Laboratory site on the north of Rivelin Lane has been bought for occupation in 2005, and the Groundwater Protection and Restoration Group will move into some very smart and much larger labs over there. We are advertising for a Professor of Structural Dynamics to build on our track record of explores research and vibration studies. We are also recruiting two lecturers in structures. One will support the new Professor. The other is to replace Matthew Gilbert, who has won an EPSRC Advanced Fellowship. He will be staying in the Department in this 5-year position to work full-time on his research in limit analysis and design synthesis methods.

In teaching, we continue to attract very able students, with an average entry standard of better than three Bs at A-level. Most take the MEng degree courses, and we continue to restrict the portfolio of courses we offer (see article inside). In 2003 the first cohort graduated from the courses designed to meet the SSeCTOR 9 requirements, and have been snapped up by industry. The accreditation visit by the Joint Board of Moderators finished a couple of days before I am writing this, and they were impressed by the students, staff and courses.

Some of you will have followed the debate in NCE about the JBM’s decision to drop the maths A-level requirement for entry; we are not adopting this policy, and will continue to ask for maths from applicants. Our view is that, if we try and teach more mathematical content and lead to higher drop-out rates.

We want to recruit a Teacher in Design, either full- or part-time. Of course, we may have filled the post by the time you read this, but if you are local to Sheffield and interested in helping with teaching, please contact me (d.n.lerner@shef.ac.uk. 0114 222 5743). Deeper in the newsletter, we have news of some of you, and we hope to have more by next year. Keep in touch!

David Lerner, FREng
Professor of Environmental Engineering and Head of Department

Contents

Welcome 1
Summer School
Research News
Imperial War Museum North
What the Department can do for you
What can you do for us?
News of former students 8

Department News

The ConGlassCrete team run two days of meetings and an industry-sponsored dinner in July this year, which attracted a number of national collaborators. Significant progress has been made towards the use of glass in concrete, through projects which examine the use of waste container, plate, windscreen, lightweight fibre glass streams as alternative coarse and fine aggregates and cement replacements in concretes. The website (www.wrap.org.uk/conglasscrete) now has searchable databases on related literature with some 4,500 entries and national subscribers. Professor Christian Meyer of Columbia University invited the Team to attend full-scale trials of glass in concrete products in New York during October as part of his effort to develop sustainable waste management practices in the city, and they gave presentations of their work to the New York administration.

The Department continues to forge links throughout the world. Besides the usual round of conferences, this year members of staff have visited a university network in Southeast Asia (Cambodia, Laos and Thailand) to research a proposal on assessing the practical balance between flood protection requirements and presence of aquatic vegetation in rectified-cement-lined and natural urban drainage channels. They have also been to Serbia and Montenegro to propose a vibration suppression solution for a wobbly footbridge; to Brazil to help with geological mapping and land assessment; and to Athens, and Budapest, where they formed part of NFATEC (A New and Flexible Approach to Teaching for Engineers in Construction). One of the aims of this project is to compare different methods of delivery of training material and the effect on the learning process, and the team ran pilot courses on Fire Engineering with material in web-based format as well as traditional face-to-face teaching.

The Senate of the Technical University of Iasi in Romania has awarded Kypiros Pilakoutas their Honorary Doctorate in recognition of his outstanding achievements in teaching and research and for his impressive co-operation with the Faculty of Civil Engineering and Architecture. Since collaboration began between our two universities, there have been many visits, participation in a variety of programmes sponsored by the British Council, the Royal Society and the EU Socrates scheme, and two Marie Curie Fellowships as well as several funding applications.

Sustainability continues to be high in the public awareness. The Pennine Water Group, led by Adrian Suli, has been awarded a large grant as part of the EPSRC Sustainable Urban Environment Initiative for the WiND project (Water and New Development). While David Lerner leads another team called SUBR:IM (Sustainable Urban Brownfield Regeneration: Integrated Management), aiming to come up with integrated and sustainable solutions for the development of brownfield land in urban areas. Both teams are multi-disciplinary, working with social scientists as well as engineers, in an attempt to address contemporary concerns about our environment.

Alan Watson retired in September 2002, but continues to have links with the Department as an Honorary Fellow. Dr Watson joined the Department in 1973 after a short period of research in Canada and a spell with Ove Arup in London, and soon developed a strong and distinguished record of scholarship in the field of structural dynamics, in particular the area of blast and impact loading. It was Dr Watson who developed the facility at Harpur Hill, Buxton, with its unique testing facilities able to measure the response of structures to high velocity impact and explosive overpressure. During his time at Sheffield, he supervised many students through their PhD studies, and we are glad he is continuing to take an interest in the Department.

www.shef.ac.uk/civil
Summer School
This summer all the departments in the Faculty of Engineering, led by Adrian Hyde in our Department, joined together to run a residential summer school for children about to start their sixth form studies, with the double aim of showing them what fun engineering can be and the choice of career they might have should they choose to study engineering at university.

“The opportunity has greatly helped in my choice for which course to take when starting university.”

“It has opened my eyes to all the different areas of engineering, and has convinced me that engineering is an exciting, interesting and satisfying career”

New Undergraduate courses
Do you have children now thinking about their UCAS applications? You may like to know about our new undergraduate degrees which have been introduced this year. The MEng Civil Engineering with Business Management is intended to provide a greater understanding of the processes for developing a business, and to apply these principles to the management of the business of construction. Modules include subjects like Industrial Psychology, Business Planning and Human Resources Management, but the course also includes all academic aspects of Civil Engineering leading to chartered status of the Institution of Civil Engineers, ICE and IStructE.

Summer School: chemical engineering project

“I especially enjoyed the field trip to the Corus steel mill”

“A fantastic worthwhile experience! It has really urged me to consider a career in civil engineering, which I wouldn’t have thought about had it not been for these four eye-opening days”

Our Department took the children into the water engineering laboratory to show them how flow rates are measured in a river or stream, followed by a visit to Derwent reservoir to look at the whole water catchment area. They could then appreciate the application of engineering principles to the use of natural resources, and possibly get inspired to want to build their own dams and reservoirs!

Other projects during the week involved designing an artificial finger, looking at robot programming, discovering how chemical engineering impacts on everyday life by examining food, drink and smells, and seeing how different materials break. There were visits to local industrial firms, and social activities like bowling and barbecues broke up the seriousness of the science.

We were pleased to receive sponsorship and help from a variety of partners, listed below. If your firm would like to join the growing band of sponsors for next summer, when the event will be repeated for another 80 children, then contact Jenny Chambers in the Department (j.a.chamber@shef.ac.uk telephone 0114 222 5725).

Thanks to our sponsors:
- Bullen Consultants
- Conset TRW Automotive
- Corus
- Excellence Challenge Sheffield and Rotherham
- Gripple Ltd
- Health and Safety Executive
- John Care Trust
- Rolls-Royce plc
- TWI Ltd

New private rail companies. Stations can now cost four times as much as a decade ago. If new, conveniently located stations are to be opened, it is vital that they be built cost effectively, safely and fully satisfy the needs of all users.

By investigating the generic design issues for new interchanges, it is hoped to produce a package for a quick-build prototype station. Then, rapid construction of stations will hopefully become a viable reality, thus influencing the public to choose rail as their preferred mode of transport, which will ease the constant pressure on the roads and built environment.

As all new stations have a number of fixed criteria, such as platform length, shelter requirements, and minimum distance between adjacent platforms, there is considerable scope for standardisation of designs and prefabrication of the necessary components. Conducting the majority of the work offsite, thus removing the dangers and costs associated with working near live railways, would allow the introduction of a manufacturing approach to the design and assembly. Construction activities at site would be restricted to site preparation and installation of foundations. Assembly of the station platforms, ancillary shelters and overbridges could then be achieved in a single weekend with the components and equipment brought to site by road or rail.

This is a joint research project, led by Buck Davison in the Department together with the School of Architecture, and joined by outside partners Anthony Hunt Associates, Derek Trowell Architects, Davis Langdon and Everest, and Corus. The project was granted funding under the DETR /EPSRC Future Integrated Transport (FIT) programme and commenced in April 2002.

Research News
Rapid Construction of Small Passenger Interchanges
My role as structural engineer for Imperial War Museum North

Richard Carroll, Structural Engineer, Ove Arup & Partners

Richard graduated from Sheffield in 1998 with an MEng in Civil & Structural Engineering, and went straight into working at Arup

The Imperial War Museum North is the Imperial War Museum’s latest facility to exhibit much of its vast archive of photo images and physical artefacts. Situated on the newly refurbished Salford Quayside, the museum charts the social impact and history of conflict throughout the 20th century.

Arup were appointed as structural engineers for the project, having given advice to the architect during the competition stage of the design. My own involvement in the project began following the scheme design and submission of tender documentation in September 1999.

The true test of any engineering design, and the basis upon which all engineering should be undertaken, is the ability of that design to be transferred from paper to physical reality. In the case of structural engineering for buildings the success of the project can be measured in terms of the buildability of the design on the construction site. To that end my role as structural engineer covered three key areas:

- Detailed design of structural elements
- Co-ordination of the structural design with the architect and other design team members
- Resolution of site queries and problems

The greatest challenge on the IWMN was the complexity of the geometry. Since the three shards are based on fragments of the Earth, almost all the surfaces within the museum slope or curve. There are almost no right angles in the structure. The floor of the main exhibition hall for example is formed from part of a sphere, being based on the Earth’s surface, and the 14 storey tall Air Shard tower in the middle of the building leans over intentionally at 4°.

The main body of the museum is the earth shard, housing the main exhibition halls, shop and building services plant. Stripping back the rendered façade of the building, the exhibition hall is seen to have been lifted more than 3m off the ground leaving two very large plant rooms at ground level either side of the entrance foyer.

Geometry was by far the most significant factor in coming up with a buildable solution for the earth shard. Six square grids were imposed on the plans, each one slightly rotated or re-sized to rationalize the complex footprint. Pre-cast driven piles were used throughout the site to minimise the necessary removal of contaminated spoil and the square grids allowed a regular system of reinforced concrete columns to spring off pilecaps and support the reinforced concrete gallery level slab.

The gallery slab was designed as a flat slab bent to the shape of a sphere; to the best of my knowledge it is the first suspended spherical slab to be constructed in the UK.

Between the contractor and ourselves we eventually devised a workable method for constructing the slab. A ‘north pole’ was defined on our drawings from which circular contours were set out at a constant change in height (similar to the earth’s lines of latitude). By placing curved screed rails on the contour lines, and using a tamping bar bent to the radius of the slab, the top surface was constructed within normal slab tolerances. The soffit profile was facced using table top forms with height adjustable legs.

The roof too is spherical, but with an off-set north pole relative to the floor below creating a constantly varying floor to ceiling height which rises to as much as 18m. Large clear spans, a tall floor to ceiling height, and a 5m deep hag fascia around the perimeter meant that a steelwork frame was the obvious solution to the roof structure. Geometry again was, however, the most significant issue. Steelwork can be expensive to bend about two axes, but of equal concern to an engineer are the potentially large secondary bending moments created by eccentricities of load from supports.

This problem is exacerbated by large spans. Our solution was therefore to return to the model of the earth and use lines of latitude and longitude. The primary roof beams were bent about one axis and set out radially from the off-set north pole forming lines of longitude. Tubular purlins, also bent about one axis, were placed between primary beams at constant centres forming lines of latitude.

Stability was provided by traditional braced bays and concrete shear walls. The design of a fully functional building depends on much more than just how it stands up. Of equal importance is how the building environment is maintained. Heating, lighting and power supply are all key to how the building will eventually operate. For a museum exhibition space all of these items need to be flexible enough to cope with a regularly changing display layout. A great deal of my time was therefore spent altering and fine-tuning the structure of the building to cope with services requirements while at the same time meeting the aesthetic aspirations of a committed architect.

The museum has now been open for little over twelve months and has exceeded even the most optimistic of visitor forecasts in that time. It is well worth a visit, not only as a modern and exciting museum with cutting edge audio visual displays, but also as a piece of architecture that required all the skills and innovation of modern engineers to bring it to life.
You still can play an active role in the life and business of the Department:

- Your firm can take placement students during vacation times
- We can collaborate on further research
- You can give a guest lecture to the Civil Eng Society or a seminar to a research group
- You can provide career profiles for course endorsement or careers guidance

Industrial Partnership Scheme

We pride ourselves on our links with industry. For many years the Department has had thriving links with leading regional and national businesses. We have an Industrial Liaison Committee that advises the Department on teaching relevant to industrial and professional interests, but during 2003 we strengthened these links further through the launch of our new Industrial Partnership Scheme involving almost two-thirds of the major employers of our graduates.

Partners are involved in teaching activities through lectures, workshops, site visits and proposing undergraduate and postgraduate course dissertation topics. They also contribute to curriculum planning and syllabus content through membership of the Department’s Industrial Liaison Committee, thus ensuring that students graduate with the knowledge and skills that industry requires. A key feature of the Scheme is that the Industrial Partners reserve a number of placement employment places specifically for the Department’s students.

New jobs at the University of Sheffield

The University has recently advertised 56 jobs across a range of academic disciplines, as part of its major staff investment strategy. These posts follow another 77 advertised simultaneously in summer 2002, 47 more created and filled since, and 18 New Blood scholarships filled from the University’s own post-doctoral students. Along with eight further posts yet to be advertised this means that the University has created more than 200 new academic posts in the space of little over a year, representing a £7.3 million investment in staff. Three of these will be in the Department of Civil & Structural Engineering.

The new appointments will further the University’s aim of retaining and enhancing our international reputation, reinforcing both our high teaching quality across the whole spectrum of subject areas and our world-class research excellence. The University is the third largest employer in the South Yorkshire region and a leading regional contributor to economic regeneration. Investment in new appointments on this scale will contribute to economic development not only through job creation but also in terms of speeding the growth of the region’s knowledge economy.
News of former students

One of the most enjoyable ways to stay in touch with your student days is to have a reunion with old friends. We will endeavour to bring you news of former students, as you will see below, and the Alumni Office at the University will help you to meet others in your year group, course or profession.

Richard Blanchfield, graduate in 1993 went on to a PhD in geotechnics under Bill Anderson. He worked for the Thames Region of the Environment Agency for four years as a Flood Defence Operations Engineer and then as a Project Manager for their Capital Works Team. He became Chartered 18 months ago and was appointed Senior Engineer/Project Manager for Kellogg, Brown and Root within Energy, Water and Environment in Leatherhead. He has now just started a two-year assignment in Edinburgh in Programme Management for the Scottish Water Solutions Integrated Asset Delivery Team, of which KBR is one of the joint venture partners.

Neal Butterworth, graduate in 1996, is now with Buro Happold.

Richard Carroll, graduate in 1998, is with Arup in Manchester. He worked with Daniel Libeskind on the Imperial War Museum North at Salford Quays, with Daniel Libeskind on the Imperial with Arup in Manchester. He worked now with Buro Happold.

Neal Butterworth, graduate in 1996, is now with Buro Happold.

Richard Carroll, graduate in 1998, is with Arup in Manchester. He worked with Daniel Libeskind on the Imperial War Museum North at Salford Quays, with Daniel Libeskind on the Imperial with Arup in Manchester. He worked now with Buro Happold.

Graham Knapp, graduate in 1997, is now with Buro Happold.

Nina Lovelace, graduate in 1997, is now a news reporter for New Civil Engineer after working with Mott MacDonald for a spell.

James Mayer, graduate in 1998, is working for Pinnacle Engineering Consultants in Triranta, Ireland.

Carmen Mosquera Ruiz, Erasmus student in 1999, is now living in Madrid and working for Mercedes-Benz España. She does “everything related to aftersales from the little smart car to the big trucks”.

Andy Swan, graduate in 1998, went on to do his PhD in the Department and is currently with Earthtech Consulting, working on the sewer rehabilitation for Yorkshire Water. He has returned on a part-time basis this year to teach a module on Environmental Engineering.

Caroline Thomas, graduate in 1999, is working with Buro Happold. She tells us she has worked on several recent interesting projects including a £21 million office development at Gatwick and a museum and tourist information centre in Banbury.

Leonard Tirimanne, Masters graduate in 1983, returned to Sri Lanka and worked as a consultant for six years before moving to the Sultanate of Oman. He is now attached to one of the government ministries in Oman as a senior Civil and Structural Engineer.

Sam Trowsdale, PhD in 2002, is currently working in New Zealand as a hydrological modeller looking at urban streams, and enjoying the outdoor activities for which NZ is famous!

Fernando Wakida, PhD in 2002, has returned to Mexico to work at the University of Baja California in Tijuana. He now has a little daughter.

Roger Woodhead, graduate in 1967, emigrated to Canada and after working for a number of years in construction and consulting engineering now has his own company, Woodhead Consultants Inc., based in Vancouver. Since founding the company he has worked on a range of projects including a cut and cover rapid transit tunnel in Kuala Lumpur, the Dong Li Lake Pavilion Project in Tianjin, China, and the Vancouver rapid transit project.

Beiyan Zhang, PhD in 2000, went to Canada and obtained a graduate diploma in computer science. Her daughter (now aged 13) is taking after her mother, becoming “best student in her year”!

Alumni Office

We are keen to make contact with you! Please help us by keeping us informed of your contact details. You can do this on the website by visiting the Alumni page and filling in the questionnaire www.shef.ac.uk/alumni/update.shtml and of course we would love to hear your news. E-mail Jenny Chambers in the Department at j.a.chambers@shef.ac.uk and tell her about what you have done since leaving Sheffield. Perhaps you can give us news about other colleagues who graduated from Sheffield.

Do you have an alumnus in mind who you feel qualifies to be nominated for a Distinguished Alumni Award? The Distinguished Alumni Awards are presented by the Vice-Chancellor for former students who have achieved distinction in their profession, through exemplary service to The University of Sheffield or the wider community, or given outstanding personal or humanitarian service locally, nationally or worldwide.

If you would like to suggest one of our alumni for consideration for an award or nominate yourself, please submit biographical information and a letter of nomination to: Miles Stevenson, Director of Development, Development and Alumni Relations, 277 Glossop Road, Sheffield, S10 2HB.

What about you? Let us know whatever you are doing now, whether it is within the profession of Civil and Structural Engineering or in pastures new. Do you have any special memories of your time here? Maybe you would like to contribute to the next issue of Civil’s Alumni News!

Email Jenny at j.a.chambers@shef.ac.uk